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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/664,846	09/22/2003	George B. Narinsky	12,544	4914

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Mr. William W. Haeffliger  
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EXAMINER

LEUNG, RICHARD L

ART UNIT	PAPER NUMBER
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3744

DATE MAILED: 06/13/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/664,846	NARINSKY, GEORGE B.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Richard L. Leung	3744	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 22 September 2003.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) 14-16 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3,5,12 and 13 is/are rejected.
- 7) ☒ Claim(s) 4 and 6-11 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 September 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>09-22-03</u> . | 6) <input type="checkbox"/> Other: _____  |

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**DETAILED ACTION**

***Election/Restrictions***

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
  - I. Claims 1-13, drawn to a process for enriching LNG in methane, classified in class 62, subclass 620.
  - II. Claim 14-16, drawn to an apparatus for enriching LNG in methane, classified in class 62, subclass 620.

The inventions are distinct, each from the other because of the following reasons:

2. Inventions I and II are related as process and apparatus for its practice. The inventions are distinct if it can be shown that either: (1) the process as claimed can be practiced by another materially different apparatus or by hand, or (2) the apparatus as claimed can be used to practice another and materially different process. (MPEP § 806.05(e)). In this case the process as claimed can be practiced by another and materially different apparatus such as one comprising separate heat exchangers for liquefying the compressed methane enriched stream and for vaporizing the initial LNG stream or one not comprising storage for the methane, ethane, propane-butane products.

3. During a telephone conversation with William Haefliger on 02 June 2005 a provisional election was made with traverse to prosecute the invention of Group I, claims 1-13. Affirmation of this election must be made by applicant in replying to this Office action. Claims 14-16 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

***Drawings***

4. New corrected drawings in compliance with 37 CFR 1.121(d) are required in this application because the labeling in the Figures is difficult to discern and does not reproduce clearly. Applicant is advised to employ the services of a competent patent draftsman outside the Office, as the U.S. Patent and Trademark Office no longer prepares new drawings. The corrected drawings are required in reply to the Office action to avoid abandonment of the application. The requirement for corrected drawings will not be held in abeyance.

Furthermore, the drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the process of claim 3 wherein said ethane enriched liquid stream is removed from an intermediate tray in the distillation column, and wherein a propane-butane enriched bottom liquid is produced, must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for

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consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Specification***

5. The disclosure is objected to because of the following informalities: the recitation of "6,364,579" on page 2, line 14, of the written description is understood to be -- 6,564,579--. Furthermore, the brief descriptions given on page 6 of the tables and graphs (Figs. 1a-1c and 2a-2c) should include an indication of what information is contained therein. Appropriate correction is required.

### ***Claim Objections***

6. Claims 7 and 9 are objected to because of the following informalities: the claims fail to provide units for the recited percentages. As understood from Fig. 1a (Table 1) the percentages in the claims represent mole percentages, and it is suggested that this be explicitly reflected in the claims. For example, the recitation of "about 0.3% of nitrogen" could be changed to --about 0.3 mole % of nitrogen--. Furthermore, the recitation of "about 34.5% or propane" in claim 9 is understood to be --about 34.5% of propane--. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

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The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claims 12 and 13 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Regarding claim 12, it is unclear to which streams "said other stream" and "said one enriched liquefied gas stream" refer. Regarding claim 13, it is unclear to which streams "said other stream" and "said one stream" refer. Accordingly the claims are considered indefinite. Since the claims are too ambiguous in scope, no prior art could reasonably be applied to the claims. However, this is not to be a presumed indication of allowable subject matter.

***Claim Rejections - 35 USC § 103***

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 1 and 2 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 5114451 (Rambo et al.) in view of US 2003/0005722 A1 (Wilkinson et al.).

Regarding claim 1, Rambo et al. disclose a method for processing LNG (liquefied natural gas) comprising the steps of pumping an initial LNG stream 21 using a pump 10 to a heat exchanger 12 wherein the LNG stream partially vaporizes (column 1, line 63 to column 2, line 4), feeding the partially vaporized initial LNG stream 31 into a middle region of a distillation column 15 (column 2, lines 6 to 9) that is understood to have a concentration section and a stripping section (column 2, lines 17 to 33), and operating

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the distillation column 15 to separate the partially vaporized initial LNG stream 31 into a methane enriched overhead gas stream 51 and into an ethane enriched liquid product stream 32. Rambo et al. further disclose the steps of warming the methane enriched gas stream 51 and compressing the warmed methane enriched gas stream 34 in compressor 17 (Fig. 4; column 3, lines 26 to 33), followed by cooling the compressed methane enriched gas stream 53 to a liquid state in heat exchanger 41, expanding the liquefied stream 54 in valve 42 and introducing the expanded stream 55 to the top of the distillation column 15 as a reflux (column 2, lines 45 to 51). Rambo et al. fail to expressly disclose the step of cooling the compressed methane enriched gas stream to a temperature at or near ambient prior to cooling the stream to a liquid state, and fails to expressly disclose the steps of distributing the compressed and liquefied methane enriched gas stream into two streams, one of which is expanded and then introduced to the top of the distillation column as a reflux and the other of which is expanded and provided as a methane product. Wilkinson et al. teach a process for producing liquefied natural gas comprising the steps of separating a natural gas stream 31 into methane enriched overhead gas stream 37 and ethane enriched liquid product stream 41 in a distillation column 19. Referring particularly to Fig. 1 and paragraphs [0038] to [0040], Wilkinson et al. further teach warming the methane enriched overhead gas stream 37 in a heat exchanger 24, compressing the warmed methane enriched gas stream 38 in a compressor 16, cooling the compressed methane enriched gas stream to a temperature near ambient in a heat exchanger 25, further cooling the compressed and cooled methane enriched gas stream 38c to a liquid state in heat exchanger 60, and

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distributing the compressed and liquefied methane enriched gas stream into two streams, one of which (stream 39) is expanded in valve 17 and then introduced to the top of the distillation column 19 as a reflux, and the other of which (stream 49) is expanded in expander 61 and provided as a methane product. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the process disclosed by Rambo et al. to include the methane enriched gas stream processing steps taught by Wilkinson et al. because such an arrangement is capable of producing a liquid methane product which is known in the art to be better suited for storage.

Regarding claim 2, Rambo et al. further disclose that it is already known in the art to keep LNG in storage regions (i.e. storage terminals) prior to processing or distribution (column 1, lines 10-13). Accordingly, it is understood that the initial LNG stream 21 is pumped using the pump 10 to the heat exchanger 12 from a storage region.

11. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over US 5114451 (Rambo et al.) in view of US 2003/0005722 A1 (Wilkinson et al.) as applied to claim 1 above, and further in view of US 5588306 (Schmidt). The combination of Rambo et al. and Wilkinson et al. demonstrate all the limitations of the claim, except for disclosing that the ethane enriched liquid stream is removed from an intermediate tray in the distillation column, and wherein a propane-butane enriched bottom liquid is produced in the distillation column, as a propane-butane product. Schmidt demonstrates that using a column for separating a natural gas feed into a methane enriched ( $C_1$ ) product stream, an ethane enriched ( $C_2$ ) product stream, and a propane-



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butane ( $C_{3+}$ ) stream is already known in the art. In particular, Schmidt teaches a process wherein a natural gas stream 11 is separated in a column such that an ethane enriched stream 12 is removed from an intermediate tray (column 2, lines 18-19), a methane enriched ( $C_1$ ) stream is removed from the top of the column, and a propane-butane ( $C_{3+}$ ) product stream is withdrawn as bottom liquid (column 2, lines 34-37). It would have been obvious to one of ordinary skill in the art to have modified the combination of Rambo et al. and Wilkinson et al. such that the ethane enriched stream is removed from an intermediate tray in the distillation column, and wherein a propane-butane enriched bottom liquid is produced in the distillation column, as in the manner taught by Schmidt, because doing so would have increased the ethane content (i.e. purity) of the ethane product stream since the heavier hydrocarbons are removed from said stream.

12. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over US 5114451 (Rambo et al.) in view of US 2003/0005722 A1 (Wilkinson et al.) as applied to claim 1 above, and further in view of US 6564579 B1 (McCartney). The combination of Rambo et al. and Wilkinson et al. demonstrate all the limitations of the claim, except for disclosing that the fluid pressure in the distillation column is between 72-174 psia and that the compressor employed to compress the methane enriched gas stream has a discharge pressure between 174 and 363 psia. McCartney teaches a similar method for processing LNG comprising the steps of pumping LNG from a storage region 10 using pumps 18 and 37 to heat exchangers 34 and 36 and distillation column (tower) 38, in which said natural gas is separated into an ethane enriched stream 46 and into a

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methane enriched stream 48 that is subsequently compressed by compressor 50 and condensed through cooling. McCartney further teaches that said distillation column 38 operates at a pressure of about 75-225 psig, which is understood to overlap the claimed pressure range of 72-174 psia, and that the compressor 50 increases the pressure of methane enriched stream 48, which has the same pressure as distillation column 38, by about 50-150 psi, and therefore has a discharge pressure that overlaps the claimed range of 174-363 psia. See particularly column 5, lines 16-53. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have used the pressures taught by McCartney in the combination of Rambo et al. and Wilkinson et al. because McCartney demonstrates that such parameters are suitable for effectively producing the desired methane enriched product, and it is well within the knowledge of one of ordinary skill to adjust the various operating parameters of the system, as this practice is routine and conventional in the art.

***Allowable Subject Matter***

13. Claims 4, 6, 8, 10, and 11 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

14. Claims 7 and 9 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims, and rewritten to overcome the objections set forth in this action.

**Conclusion**

15. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

US 2952984 (Marshall, Jr.): discloses a process for fractionating LNG comprising pumping LNG from a storage source to heat exchangers that warm the LNG, introducing the warmed LNG to the middle section of a fractionating tower, and producing a methane-rich stream and an ethane-rich stream.

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Richard L. Leung whose telephone number is 571-272-4811. The examiner can normally be reached on Mon-Fri.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cheryl J. Tyler can be reached on 571-272-4834. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Richard L. Leung  
Examiner  
Art Unit 3744

  
**CHERYL TYLER**  
**SUPERVISORY PATENT EXAMINER**